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Analysing the peer relationships of obese and normal-weight preschool children aged between five and six years[†]

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The objective of this study is to reveal whether the peer relationships of preschool children who are determined to be obese, based on their body mass index (BMI), differentiate or not. The study was conducted within the frame of a relational survey model. A total of 114 five- to six-year-old children (57 normal-weight children and 57 obese children), who attend preschool educational institutions, participated in the study. The Ladd-Proffitt Child Behaviour Scale and Peer Victimization Scale were used to obtain data of the study. Multivariate Analysis of Variance (MANOVA) was used to test the data. As a result of the study, there were significant differences on *prosocial behaviour* and *hyperactivity* levels of children according to their gender and at *aggressiveness*, *prosocial behaviour* and *hyperactivity* levels according to the state of being obese. Besides, significant differences were observed on *asocial behaviours*, *hyperactivity* and *peer victimisation* levels of children according to the state of being obese and gender interaction.

Keywords: five- to six-year-old children; obesity; obese children; peer relationships; peer victimisation

Introduction

Obesity is defined as a multilateral condition that occurs as a result of the deterioration of the balance between energy intake and consumption in favour of the energy intake (Dişçigil 2007). Occurring as a result of malnutrition in children, this condition is caused by genetic, environmental and psychological factors. Psychological factors such as negative relations between mother and father, failure at school and being unable to make friends might adversely affect the mental structure of the child, cause over-eating and finally obesity (Babaoğlu and Hatun 2002; Köksal and Özel 2008; Öztora 2005).

According to researchers (Parlak and Çetinkaya 2007; Yiğit 2011), even though obesity is seen at all ages, it is encountered more frequently in the years when initial fat storage occurs; namely the first year of life, five to six years of age and the adolescent period. It is reported that the risk of children, who start to gain weight rapidly within the first five years of life, becoming obese during adolescence and adulthood

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is higher than those who start to gain weight after the ages of six to seven, and that while the babyhood obesity has a probability to recover spontaneously as children grow, the childhood and adolescence obesity has a high risk of continuing into adulthood.

The relevant literature (Coşoveanu and Bulucea 2011) emphasises that preschool obesity is an important health problem and is widespread all over the world. According to the data of the International Obesity Association, 22 million children around the world under the age of five are overweight and obese (Malecka-Tendera and Mazur 2006; World Health Organization 2007). It is indicated that in the US, since 1970, the obesity rate has doubled for two- to five-year-old preschool children and 12- to 19-year-old adolescents, and tripled for the age group six to 11. Approximately 9 million children older than six are obese and therefore politicians consider childhood obesity a serious threat to public health (Koplan, Liverman, and Kraak 2005). In EU countries, on the other hand, the estimation studies of paediatric obesity prevalence and its tendency to increase have not been concluded, due to the methodological problems in the definition of obesity and a lack of data that would reflect the demographic, cultural and socio-economic composition of the population (Gürel and İnan 2001). It is reported that there is no sufficient data, since no comprehensive study has been conducted on the prevalence of obesity in preschool children in Turkey, and the studies which have been conducted are based on screening a limited number of children (Yüce 2007). For instance, Yabancı et al. (2009) conducted a study on 375 five- to six-year-old children who are registered at a preschool educational institution under the Ministry of National Education in Ankara Keçiören in order to determine the prevalence and affecting factors of obesity in preschool children. They concluded that the overweight prevalence is 8.3%, obesity prevalence is 10.1%, and that boys are fatter than girls. In another study that was planned in an attempt to define the obesity prevalence and risk factors of preschool children, 100 three- to six-year-old children who attend at a preschool educational institution were included. As a result of the study, for boys the rate of being overweight was 32.2% and the rate of obesity was 3.5%. For girls the rate of being overweight was 14.8% and the rate of obesity was 7.7%. It was determined that boys are relatively heavier in all age groups (Önder 2011). According to some researchers (Parlak and Çetinkaya 2007), obesity has become an important health problem for preschool- and school-age children especially in cities and the rate of obesity has increased together with the increasing socio-economic level in large cities.

According to specialists (Köksal and Özel 2008; Yüce 2007), childhood obesity causes numerous medical problems, such as orthopaedic problems, nappy rashes, fat accumulation around the chest in boys, cracked skin, skin infections, difficulty in breathing, cardiovascular diseases, hypertension, diabetes, gall stones, sleep apnoea, neurological complications, endocrine system disorders, and risk of cancer. In addition to the medical problems, obesity also causes emotional and behavioural problems (Griffiths, Dezateux, and Hill 2011) such as anxiety, depression, introversion, loss of self-confidence (Dallar et al. 2006; Seyedaminii et al. 2011), social discrimination (Warschburger 2005), problems in peer relationships (Boneberger et al. 2009), social isolation (Nonogaki, Nozue, and Oka 2007), peer victimisation (Gray, Kahhan, and Janicke 2009; Griffiths et al. 2006; Janssen et al. 2004), and lack of attention/hyperactivity disorder (Erhart et al. 2012). In a study conducted by Su and Di Santo (2012) for the purpose of determining the perceptions of preschool children regarding whether obese children have negative features or not, they asked 32- to 70-month-old children to listen to four stories, which involved an interaction between two children, one of

whom displayed a socially-disapproved behaviour, and the other displayed prosocial behaviour. The stories were presented in two ways by using obese and normal-weight characters. As a result of the study, it was observed that said children perceived the behaviour of the obese character in a more negative way. Similar studies (Turnbull, Heaslip, and McLeod 2000; Wardle, Volz, and Golding 1995) on related matters revealed that preschool children had negative attitudes regarding obesity. It was put forward that this negative perception about obesity causes obese children to be excluded by their peers and be exposed to peer victimisation, and this consequently adversely affects the social and mental development of obese children in the short- and long-term (Janssen et al. 2004). On the other hand, obesity (Baumeister and Härter 2004) could give rise to negative social outcomes in the long-term by affecting academic performances of children, as well. In other words, it was observed that obese preschool children had lower scores in mathematics and reading test compared to their normal-weight peers (Datar, Sturm, and Magnabosco 2004). In addition to effect of obesity on peer relationships, research (Brown, Odom, and Conray 2001; Gülay 2009) conducted on the preschool period demonstrated that children's peer relationships in the preschool period had short-term and long-term influences in developmental areas. The absence of quality peer relationships also appears to be important in children's social and emotional developments. Poor peer relations are highly predictive for psychological maladjustment.

To sum up, obesity affects children in terms of both physical and psychological health. Moreover, it is observed that the studies conducted in Turkey are generally conducted in the field of health (Gürel and İnan 2001; Uskun et al. 2005; Yiğit 2011) with subject titles such as the prevalence (Akgün et al. 2006; Önder 2011; Yabancı et al. 2009) and medical outcomes of obesity (Akçay 2008; Yüce 2007), and that the number of studies regarding the effect of obesity on the psychological health and social relations is very limited, and the studies generally include adolescents and adults (Başbakal et al. 2007; Dallar et al. 2006). The literature review determined that there is no study regarding the effect of obesity in preschool children on peer relationships. Besides, the rate of being obese is moderate in children in the city centre of Konya, where the study was conducted (Uğuz and Bodur 2007). Thus, whether the obesity causes a differentiation in peer relationships of preschool children or not was determined by studying with children in the city centre of Konya.

Problem sentence

This study sought an answer for the question 'Do the peer relationships of five- to six-year-old preschool children, who are obese in terms of the variable of gender, differentiate compared to normal-weight children?'

Sub-problems

1. Do the peer relationships of five- to six-year-old children (levels of aggressiveness with peers, prosocial behaviour, asocial behaviour, fearful-anxious towards peers, exclusion, hyperactivity, peer victimisation) differentiate according to obesity?
2. Do the peer relationships of five- to six-year-old children (levels of aggressiveness with peers, prosocial behaviour, asocial behaviour, fearful-anxious towards

- peers, exclusion, hyperactivity, peer victimisation) differentiate according to gender?
3. Do the peer relationships of five- to six-year-old children (levels of aggressiveness with peers, prosocial behaviour, asocial behaviour, fearful-anxious towards peers, exclusion, hyperactivity, peer victimisation) differentiate when the variables of obesity and gender are considered together?

Method

Research model

The study was conducted using the relational survey model.

Participants

The sample group of the study consists of five- to six-year-old obese and normal-weight children, who attend kindergarten Classes of Public Primary Schools and Independent kindergartens in the district Selçuklu of Konya Provincial Directorate for National Education. While forming the sample group, kindergarten classes of 10 primary schools and three independent kindergartens were determined among the primary schools and independent kindergartens in the district of Selçuklu of Konya by using randomised sampling method. Finally, 57 obese children, and 57 normal-weight children (a total of 114 children) were included in the study. The average age of children who participated in the study is five years seven months (maximum: six years nine months; minimum: four years 10 months). Among the children who participated in the study, 72% were male and 28% were female. Regarding the mothers of children, 44% were primary school graduates, 28% were secondary school graduates, 28% were high school graduates; 36% were 20- to 30-years-old, 64% were 31-years-old and older; 75% were unemployed and 25% were employed. Regarding the fathers of the children, 30% were primary school graduates, 26% were secondary school graduates, 44% were high school graduates; 23% were between 20- to 30-years-old, 77% were older than 31; 30% were civil servants, 15% were employed and 55% were self-employed. Moreover, 25% of these children are only children and 75% have siblings. Children included in the study group have families with a middle socio-economic level.

Measures

Ladd and Profilet Child Behaviour Scale

It is an assessment instrument, which was developed by Ladd and Profilet for the purpose of assessing the relations of preschool children with their peers at school, within the knowledge of teachers in 1996. The scale consists of six sub-scales that represent variables such as the aggressive behaviour that affects peer relations, prosocial behaviour, asocial behaviour, exclusion, fearful-anxiety and hyperactivity (Ladd and Profilet 1996). All items in the scale are assessed with the statements, 'Non-Applicable', 'Occasionally Applicable', and 'Completely Applicable'. No general overall score can be mentioned in the scale, due to the structure of sub-scales. Each sub-scale is assessed in itself. Total scores that are obtained from sub-scales express the frequency of the behaviour represented by that scale. The scale was adapted into Turkish by Gülay (2008). As a result of the reliability-validity studies performed after the

linguistic equivalence study, internal consistency coefficient of the scale was determined to be .81. The internal consistency coefficient of the sub-scale of aggressiveness with peers was .87, internal consistency coefficient of sub-scale of prosocial behaviours with peers was .88, internal consistency coefficient of sub-scale of asocial behaviours with peers was .84, internal consistency coefficient of sub-scale of fearful-anxious towards peers was .78, internal consistency coefficient of sub-scale of being exclusion by peers was .89, and internal consistency coefficient of sub-scale of hyperactivity was .83 (Gülay 2008).

Peer Victimisation Scale

It is an assessment instrument that was developed by Kochenderfer and Ladd in 2002 based on the 'Peer Victimisation-Self-Assessment' Scale (Self Reports of Victimization) that was developed for five- to six-year-old children in 1997. It is filled out by teachers. The scale includes four items in total, each of which is related to four types (physical, indirect, direct and general) of peer aggressiveness. Each item is assessed with the statements, 'Never', 'Sometimes' and 'Always' (Ladd and Kochenderfer-Ladd 2002). Linguistic equivalence and reliability validity studies of the scale were performed by Gülay in 2008. Internal consistency coefficient of the scale was .72 (Gülay 2008).

Procedures

In order to specify whether the children were obese or not, heights and weights of children were measured individually. The heights of children were measured by putting their bare feet together, enabling the head, back, hip and heels to touch a flat wall and using a steel tape line from top to the sole. A precision bathroom-type scale was used for the determination of their weights. The weights of children were measured by enabling them to get on the scale, which was placed on a flat surface and adjusted to zero, with their lightweight clothes and bare feet. After writing the heights and weights, an interview was made with the class teacher and birth date and gender of each child were recorded with their height and weight measurements. In the following phase, Body Mass Index (BMI) values of each child were determined by recording the data about height and weight and also the gender and birth date of the children on the calculator of child BMI on the website of the Ministry of Health, General Directorate of Basic Health Services, Department of Nutrition and Physical Activities (2012) and the children were classified as underweight, normal-weight, slightly overweight and obese according to BMI values. Underweight and slightly overweight children were not included in the study. Teachers filled out the Child Behaviour Scale, the Peer Victimization Scale according to their general observations about children taken over approximately four months. Before the application, researchers informed the teachers about the scales and the objective of the study.

Analysis

Since the number of independent and dependent variables was more than one, Multivariate Analysis of Variance (MANOVA) was used in this study. In all analyses, the value of .05 was accepted as the significance level.

Results

Table 1 illustrates the values of peer relationships of children according to gender and overweight or not (aggressiveness with peers, prosocial behaviour, asocial behaviour, fearful-anxious towards peers, exclusion, hyperactivity, peer victimisation).

Examining Table 1; prosocial behaviour and hyperactivity scores of children differentiate according to gender. There is a difference between prosocial behaviour (M=24.156) and hyperactivity (M=5.906) scores of girls and prosocial behaviour (M= 21.597) and hyperactivity (M=7.012) scores of boys; and also a differentiation between their aggressiveness, prosocial behaviour and hyperactivity scores according to state of being obese. Aggressiveness (M=11.000), prosocial behaviour

Table 1. The descriptive statistics of scores obtained for peer relationships depending on gender and obesity.

	Gender	State of being obese	<i>x</i>	sd	<i>N</i>
Aggressiveness	Boy	Obese	11.487	3.96	41
		Normal	8.707	2.66	41
		Total	10.097	3.64	82
	Girl	Obese	9.750	2.67	16
		Normal	8.062	1.48	16
		Total	8.906	2.29	32
	Total	Obese	11.000	3.71	57
		Normal	8.526	2.39	57
		Total	9.763	3.35	114
Prosocial behaviours	Boy	Obese	20.000	4.62	41
		Normal	23.195	5.11	41
		Total	21.597	5.10	82
	Girl	Obese	23.437	4.68	16
		Normal	24.875	5.08	16
		Total	24.156	4.86	32
	Total	Obese	20.964	4.85	57
		Normal	23.666	5.12	57
		Total	22.315	5.14	114
Asocial behaviours	Boy	Obese	10.146	2.47	41
		Normal	9.512	2.66	41
		Total	9.829	2.57	82
	Girl	Obese	8.625	2.12	16
		Normal	10.250	2.40	16
		Total	9.437	2.38	32
	Total	Obese	9.719	2.46	57
		Normal	9.719	2.59	57
		Total	9.719	2.51	114
Fearful-anxious	Boy	Obese	14.097	3.30	41
		Normal	11.878	3.09	41
		Total	12.987	3.36	82
	Girl	Obese	13.437	2.12	16
		Normal	13.437	3.26	16
		Total	13.437	2.71	32
	Total	Obese	13.912	3.01	57
		Normal	12.315	3.19	57
		Total	13.114	3.19	114

(Continued)

Table 1. (Continued).

	Gender	State of being obese	$\bar{x}$	sd	N
Exclusion	Boy	Obese	10.195	3.41	41
		Normal	8.243	1.99	41
		Total	9.219	2.94	82
	Girl	Obese	8.437	2.52	16
		Normal	8.250	1.98	16
		Total	8.343	2.23	32
	Total	Obese	9.701	3.26	57
		Normal	8.245	1.97	57
		Total	8.973	2.78	114
Hyperactivity	Boy	Obese	8.024	2.68	41
		Normal	6.000	1.89	41
		Total	7.012	2.52	82
	Girl	Obese	5.937	2.04	16
		Normal	5.875	1.70	16
		Total	5.906	1.85	32
	Total	Obese	7.438	2.67	57
		Normal	5.964	1.83	57
		Total	6.701	2.40	114
	Boy	Obese	5.487	1.77	41
		Normal	4.414	.80	41
		Total	4.951	1.47	82
Peer victimisation	Girl	Obese	4.375	.80	16
		Normal	4.500	1.09	16
		Total	4.437	.94	32
	Total	Obese	5.175	1.63	57
		Normal	4.438	.88	57
		Total	4.807	1.36	114

Note: Values of variables and groups having a significant difference according to MANOVA results are shown in bold.

($M=20.964$) and hyperactivity ($M=7.438$) scores of obese children are higher than aggressiveness ($M=8.526$), prosocial behaviour ($M=23.666$) and hyperactivity ($M=5.964$) scores of normal-weight children. On the other hand, in asocial behaviour, hyperactivity and peer victimisation scores, an interaction between state of being obese and gender variables is observed.

Table 2 illustrates results of Multivariate Analysis of Variance regarding scores of the peer relationships (aggressiveness with peers, prosocial behaviour, asocial behaviour, fearful-anxious towards peers, exclusion, hyperactivity, peer victimisation) of five- to six-year-old preschool children according to gender, state of being obese and the interaction of gender*state of being obese.

When examining the origin of differences, the fundamental effect of gender on prosocial behaviours ($F= 6.327$, $p<.013$) and hyperactivity ($F= 5.738$, $p<.018$) scores is significant. Considering the means on which the fundamental effect is significant (see Table 1), it is observed that prosocial behaviour ($M=21.597$) mean scores of boys are lower than prosocial behaviour ($M=24.156$) mean scores of girls; and their hyperactivity ($M=7.012$) mean scores are higher than hyperactivity mean scores of girls ($M= 5.906$).

The fundamental effect of the state of being obese is significant on the scores of aggressiveness ($F= 11.981$, $p<.001$), prosocial behaviours ($F= 5.185$, $p<.025$) and

Table 2. Results of Multivariate Analysis of Variance (MANOVA) of peer relationships according to gender and state of being obese.

Source of the variance	Dependent variables	<i>F</i>	<i>p</i>	Wilks' Lambda	<i>p</i>
Gender	Aggressiveness	3.407	.068	.865	.031*
	Prosocial behaviours	6.327	.013		
	Asocial behaviours	.568	.453		
	Fearful-anxious	.490	.486		
	Exclusion	2.487	.118		
	Hyperactivity	5.738	.018		
	Peer victimisation	3.713	.057		
State of being obese	Aggressiveness	11.981	.001	.866	.032*
	Prosocial behaviours	5.185	.025		
	Asocial behaviours	.908	.343		
	Fearful-anxious	2.981	.087		
	Exclusion	3.708	.057		
	Hyperactivity	5.108	.026		
	Peer victimisation	3.162	.078		
Gender * State of being obese	Aggressiveness	.717	.399	.914	.213
	Prosocial behaviours	.746	.390		
	Asocial behaviours	4.722	.032		
	Fearful-anxious	2.981	.087		
	Exclusion	2.521	.115		
	Hyperactivity	4.515	.036		
	Peer victimisation	5.050	.027		

* $p < 0.05$.

hyperactivity ($F = 5.108$, $p < .026$). Considering the means on which the fundamental effect is significant (see Table 1), it is observed that while the aggressiveness ($M = 11.000$) and hyperactivity ($M = 7.438$) mean scores of obese children are higher than the aggressiveness ($M = 8.526$) and hyperactivity ($M = 5.964$) scores of normal-weight children; their prosocial behaviour ($M = 20.964$) mean scores are lower than the prosocial behaviour ($M = 23.666$) mean scores of normal-weight children.

In addition, it is also observed that the common effect of the variables of gender and state of being obese is statistically significant on asocial behaviours ($F = 4.722$; $p < .032$), hyperactivity ($F = 4.515$; $p < .036$) and peer victimisation ($F = 5.050$; $p < .027$); on the other hand, it has no common effect on aggressiveness, prosocial behaviour, fearful-anxious and exclusion. The results refer to an interaction in the sub-scales of asocial behaviours, hyperactivity and peer victimisation. Results are presented in Figures 1, 2 and 3 to be examined visually. Figure 1 illustrates the change on the asocial behaviour levels of children according to the state of being obese and gender interaction.

As seen in Figure 1, while the asocial behaviour scores of obese girls are lower than the scores of normal-weight girls, the scores of obese boys are distinctly higher than the scores of normal-weight boys. On the other hand, while the asocial behaviour scores of obese boys and normal-weight girls are close to one another, the asocial behaviour scores of obese girls are lower than the scores of normal-weight boys. Figure 2 illustrates the change on hyperactivity level of children according to the state of being obese and gender interaction.

As seen in Figure 2, while the hyperactivity scores of obese and normal-weight girls are almost the same, the hyperactivity scores of obese boys are distinctly higher than the

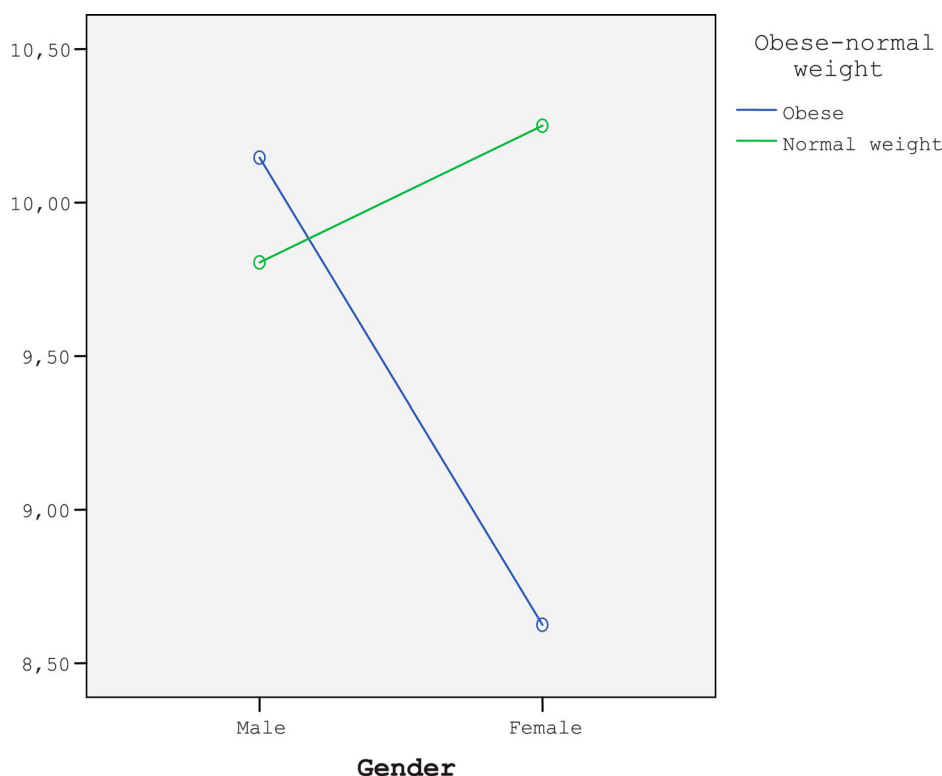


Figure 1. Differentiation on asocial behaviour levels of girls and boys according to the state of being obese.

normal-weight boys. Besides, while the hyperactivity scores of normal-weight boys and obese girls are close to one another, the hyperactivity scores of normal-weight girls are notably lower than scores of obese boys. In other words, it could be asserted that there are significant differences on children's hyperactivity levels according to state of being obese and gender, and there is an interaction between these two variables. Figure 3 illustrates the change on the children's peer victimisation level according to interaction of the state of being obese and gender.

As is seen in Figure 3, the peer victimisation scores of obese and normal-weight girls are close to one another; and the peer victimisation scores of obese boys are higher compared to normal-weight boys. Besides, while the peer victimisation scores of normal-weight girls are lower compared to obese boys, the peer victimisation scores of obese girls and normal-weight boys are close to one another.

Discussion

This study investigated whether or not the peer relationships of preschool children differentiate according to the variables of gender and state of being obese (levels of aggressiveness with peers, prosocial behaviour, asocial behaviour, fearful-anxious towards peers, exclusion by peers, hyperactivity, peer victimisation), in line with problems and sub-problems. When examining the data of Table 2 in order to assess the first result of the study, it is observed that there are significant differences on *prosocial*

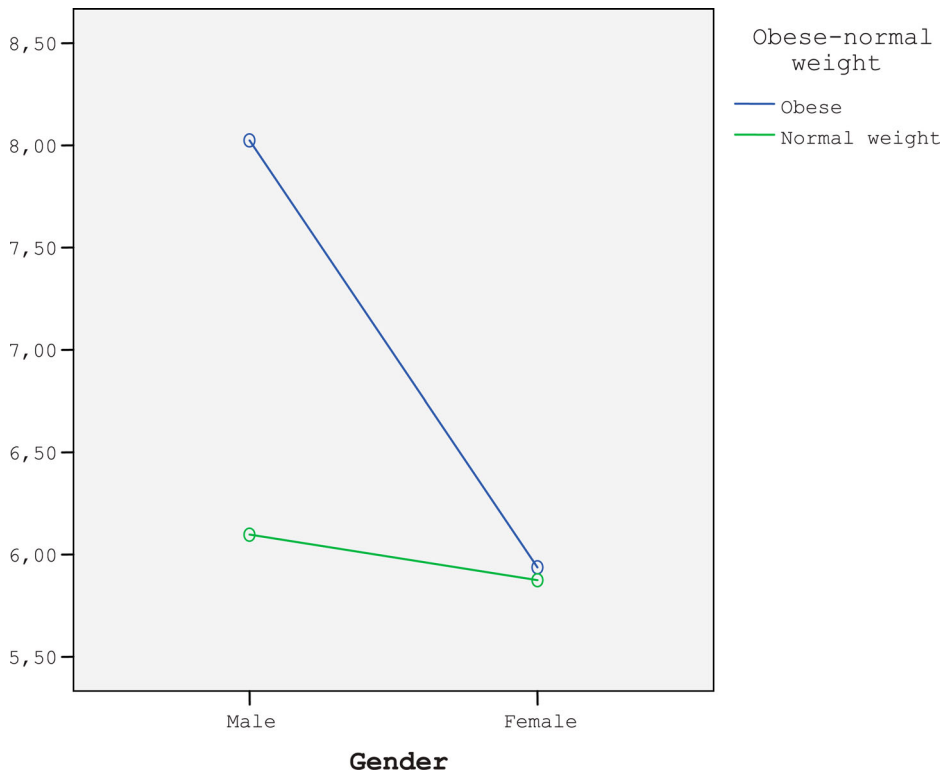


Figure 2. Differentiation on hyperactivity levels of girls and boys according to the state of being obese.

behaviour and *hyperactivity* levels of children according to gender. It could be asserted that girls are more social and less active compared to boys. Besides, the relevant table also shows that there are significant differences between *aggressiveness*, *prosocial behaviour* and *hyperactivity* levels of children, according to the state of being obese. In other words, while the aggressiveness and hyperactivity levels of obese children increase in comparison with normal-weight children, their prosocial behaviour levels decrease. Regarding interaction of gender and the state of being obese, a significant difference is observed on *asocial behaviour*, *hyperactivity* and *peer victimisation* levels of children. While the asocial behaviour scores of obese girls are lower than normal-weight girls and boys, the scores of obese boys are higher than normal-weight boys and similar with normal-weight girls. While the hyperactivity scores of obese girls and normal-weight girls and boys are close to one another, the scores of obese boys are higher compared to both the normal-weight girls and boys. While the peer victimisation scores of obese girls are similar with normal-weight girls and boys, the scores of obese boys are higher than both the normal-weight boys and girls. For instance, Griffiths et al. (2011) indicated that childhood obesity is associated with emotional and behavioural problems. In their study, they concluded that compared to their normal-weight peers, five-year-old obese boys have more problems in their behaviours, peer relations and prosocial behaviours, they are hyperactive and careless; in addition to this, obese girls have more prosocial (positive) behaviours than their

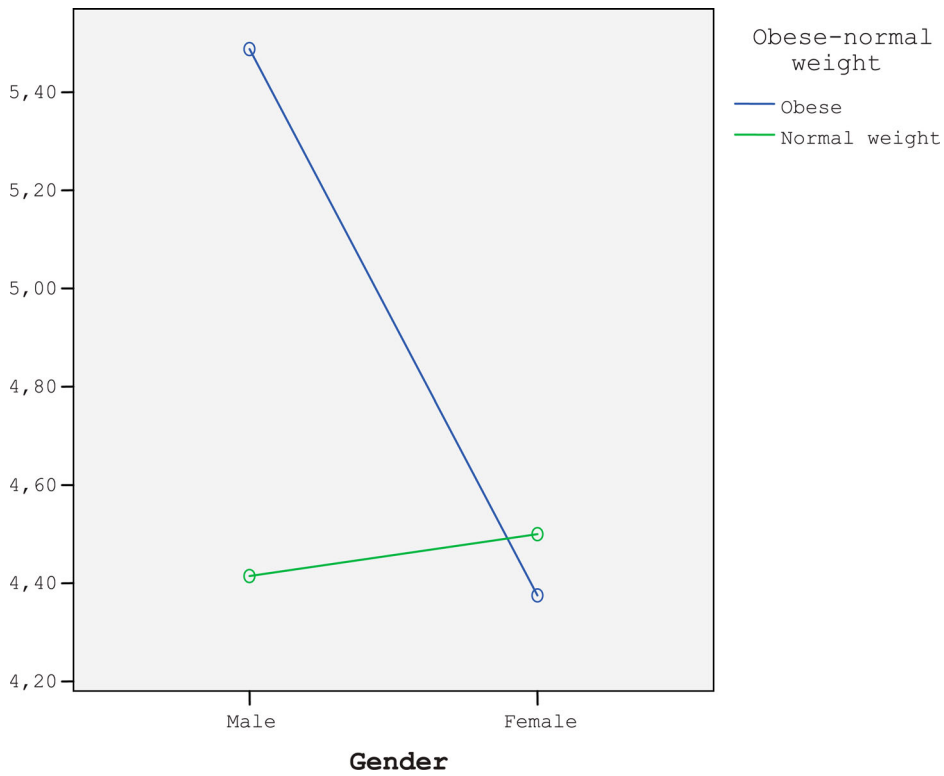


Figure 3. Differentiation on peer victimisation levels of girls and boys according to the state of being obese.

normal-weight peers. According to these researchers, especially the obese boys are at risk and the obesity that is experienced by three-year-old boys might predict the problems with peer relations at age of five. Drukker et al. (2009), on the other hand, examined whether there was a relationship between the weight status of children in two different age groups and their psycho-social disorders or not. Seven hundred and ninety-seven children in the age group of five to six and 614 children in the age group of 13–14 participated in the study. In the study, they determined that five- to six-year-old obese children have more behavioural problems compared to their normal-weight peers; overweight and obese adolescents, on the other hand, have less prosocial behaviours and more problems with peers. In addition to study results, some studies in the literature indicated that obese boys have more deficiencies in gross motor, verbal, social and daily life skills (Cawley and Spiess 2008) compared to their peers.

Examining the studies on obesity and peer relations, it is observed that studies have two different aspects. While the first aspect is associated with the fact that difficulties experienced in peer relationships might cause obesity, the second aspect is the fact that peer relations might be destroyed as a result of obesity. The results of studies, which were conducted on the fact that difficulties experienced by children in peer relationships might cause obesity, are remarkable. For instance, in their study conducted on rats; Nonogaki et al. (2007) asserted that socially isolated rats have a tendency to gain weight and therefore, social isolation is an environmental factor that contributes

to the development of obesity and type 2 diabetes. Other studies (Cortese and Penalver 2010; Cortese et al. 2008; Erhart et al. 2012) indicate that there is a relation between attention deficit/hyperactivity disorder (ADHD) and obesity in children. ADHD reveals eating habits that cause the development of obesity by causing weak behavioural control and impulsive behaviour in children. These children are thought to have a greater tendency to use food as a means of taking pleasure, compared to their normal peers. On the other hand, Annagür et al. (2012) revealed that impulsive individuals have weak control over their eating behaviours and a great interest in delicious and high-calorie nutrients, ADHD is determined on a great majority of children treated with obesity (58%), the BMIs of children with ADHD are higher than the control group; however, in their studies, they concluded that obesity has a stronger relation with emotional features compared to impulsive features, and especially the people with depression have higher impulsivity scores. Besides, considering that obese individuals frequently have depression, these researchers indicated that a relationship is expected between obesity and impulsivity, however, there is no such a relationship in their study and this could be associated with a limited number of cases.

Studies related with the fact that peer relations might be destroyed as a result of obesity emphasise that obese children experience problems with their peer relationships as a result of exclusion by their peers. For instance, Cramer and Steinwert (1998), Sigelman, Miller, and Whitworth (1986), Musher-Eizenman et al. (2004) stated that children up to the age three show a negative attitude towards their obese peers. Children at this age believe that their obese peers have much more negative personal and behavioural features compared to other peers and due to this condition, they prefer them less as playmates. In their study, which involved 119 children from preschool period to the third grade and was conducted to determine the reactions of children against their peers according to their physical features, Sigelman et al. (1986) concluded that the tendency of children to like their obese peers decreases as they get older. On the other hand, Gray et al. (2009) put forward that obese children have a risk of being stigmatised by their peers based on weight, children have negative attitudes towards their obese peers, and they express their friendship selection and aggressiveness with explicit (such as pushing, hitting) and relational (spreading rumours, mocking, etc.) forms. In addition to these results obtained from preschool children, similar results are obtained in studies that include children of different ages. For instance, Zeller, Reiter-Purtill, and Ramey (2008) state that normal-weight children are less likely to select obese children as friends and embrace them. Being introvert, physically unattractive, less athletic, sick and tired, these obese children have less leadership, aggressive and destructive behaviours and they frequently consider being absent from school. In other words, it is suggested that the fact that obese children are perceived to be less attractive and athletic by their peers could be the reason for exclusion.

As a consequence, it could be asserted that there is a mutual interaction between obesity and peer relationships. While negative peer relationships cause obesity in children, the state of being obese might also adversely affect the peer relationships in children. In other words, a relation might be mentioned between obesity and peer relationships, in terms of cause and effect.

Limitations

The limitations of the study are that a limited number of obese children, who attend pre-school educational institutions in the city centre of Konya, were included in the study

and the information regarding the peer relationships of children was obtained only based on teachers' views.

Conclusion and suggestions

In line with the data obtained from the study, it is observed that;

- While the *prosocial behaviour* scores of girls are higher than boys, their *hyperactivity* levels decrease,
- While the *aggressiveness, and hyperactivity* scores of obese children are higher than their normal-weight peers, their *prosocial behaviour* levels decrease,
- There is an interaction between the state of being obese and gender in terms of the *asocial behaviours, hyperactivity and peer victimisation* levels of children.

The following suggestions were made in line with these results of the study.

- First and foremost, obesity, which is determined to have an effect on peer relationships of children, should be prevented at a young age.
- Considering the conclusion that obese boys are at a greater risk of being hyperactive and exposed to peer victimisation, more detailed studies related to these children might be suggested. Besides, it can be asserted that there is a need for social skill training programmes aimed at obese boys and girls, although they are at a less risk.
- In this study, peer relationships of children are limited with the obtained data based on the observations of teachers. In the studies to be conducted, data with higher reliability that are supported by the data that could be obtained from children and their families should be collected.
- Including a greater number of obese children, studies in which the sample number is higher should be conducted.

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